medium-size flowers, at first of a greenish colour streaked or blotched with purple, and finally of a dull red, with very small, almost black petals. The tube of the calyx is very much constricted immediately above the ovary, and there is a second constriction a little higher up. Moreover, the flowers are trimorphic in the relative lengths of the style and stamens. That this *Fuchsia* yields "one of the strongest and most durable timbers in the colony" will be news to most people. But, as the trunk is often crooked or gnarled, it is difficult to procure logs exceeding 8 or 9 feet in length, and its commercial value is therefore greatly diminished. Mr. Kirk says the wood is hard, dense, compact, and even, and deep brown in colour, relieved by streaks of a paler shade, and short narrow waved black markings. When much waved, it is of a highly ornamental character. Further, it is almost indestructible even by fire, except in a closed furnace.

Many more interesting facts might be extracted from this admirable book, the botany of which appears to be equally as good as the practical part. A few new species are described, and the female flower of *Podocarpus totara* and the male catkin of *Dacrydium cupressinum* are figured and described for the first time.

One more point deserves mentioning. Mr. Kirk is very much concerned about the many inappropriate popular colonial names, which he proposes to reform; but we think he has undertaken a task in which he must inevitably fail. From the time of the earliest settlements, the various species of native beech (*Fagus*) have been called red birch, white birch, &c., though not uniformly throughout the colony; and the Maori language has only one common name for all the species. Now, Mr. Kirk proposes calling them "entire-leaved beech," "tooth-leaved beech," and so on. Supposing it were possible to effect a reform in this direction, the substitution of such uncouth names as those proposed is less to be desired than the retention of their present botanically inaccurate appellations.

W. BOTTING HEMSLEY.

AN ELEMENTARY TEXT-BOOK OF CHEMISTRY.

An Elementary Text-book of Chemistry. By William G. Mixter. Second and Revised Edition. (London: Macmillan and Co., 1889.)

THIS volume belongs to the well-known series of "Manuals for Students," and will pleasantly surprise those who imagine that the multitude of elementary text-books of chemistry has made originality impossible. Of those smaller matters that readers and students generally accept with no more thought than their daily mercies, the index deserves especial mention as being exceptionally inclusive, and bearing evident signs of having been compiled by someone who had a sufficient knowledge of the subject to go beyond the mere verbiage, and enough patience to carry the task through.

Looking at the book simply as a treatise on chemistry, the adoption of the periodic system as a method of classification is very desirable, but the difficulty as to which of its elements a compound shall be associated with is not easily settled. The tendency is doubtless to keep the compounds of any one metal together, and this is what the author has done as far as possible, but as, for example, nine metals are treated of before oxygen and sulphur, and thirty-eight metals before carbon, the compounds of those metals that are considered in the earlier pages are spread through the book in a manner that is doubly confusing, the interpolated sections seriously interfering with the general arrangement. The sulphates of sodium, for instance, cannot be considered with sodium itself before sulphur has been mentioned, nor can they be added to sulphuric acid, as that would disturb the natural sequence of sulphur, selenium, and tellurium compounds, and the best place remaining for them is in the middle of one of the groups of elements. As a natural result of this apparently unavoidable irregularity, such a common salt as manganese sulphate finds no place at all, and it cannot be supposed that it is intentionally omitted when manganese tetrafluoride, hydrogen auryl sulphate, gold sulphate, and other equally rare compounds have considerable space allotted to them.

There is another marked innovation that certainly deserves success—namely, the introduction of gravimetrical quantitative experiments. The very first experiment in the division of the book headed "Chemistry" is the preparation of hydrogen by the action of sodium upon water, and the student is directed, after weighing the sodium and measuring the gas, to calculate the relative weights of the two, making all due corrections. In the next experiment the proportion between the weights of equivalent amounts of zinc and hydrogen is determined.

If the volume before us were simply an experiment in text-books, we might leave off here by congratulating the author on the measure of success that he has realized; but his first words in the preface are, "This work is designed for use in schools and colleges." The tendency at the present time is not merely to introduce the study of chemistry, but to extend the general scope of education in many other ways, so that the time devoted to chemistry has been very much reduced in some cases to allow of the addition of other subjects to the student's carriculum. It would be difficult to find a student who would have time to work through 238 experiments in elementary chemistry, especially when many of them are in reality a combination of three or four; and besides the specific experiments enumerated there are suggestions in the text that the student should prepare certain compounds and verify their properties. We do not hesitate to say that the intelligent performance of a fifth of the number of experiments set down to be done, accompanied with suitable study, would give the student as serviceable a knowledge of the subject as if he went through the mass of practical work prescribed.

The author also says in his preface that "Graphic and constitutional formulas are much used," and the body of the book fully bears out the statement. Graphic formulæ have been perseveringly tried in this country as an aid to the elementary student of inorganic chemistry, and have been deliberately discarded as uselessly cumbrous, and as making what is difficult to the beginner more difficult still. Such formulæ, however, are occasionally useful; but we would ask what good end is served by setting down the graphic formula of $Na_4W_3O_{11}$, which is given at p. 190? The best formula is that which most

© 1889 Nature Publishing Group

simply expresses the properties of a compound, but it would be difficult to say what properties are indicated by such formulæ as that referred to.

There are a few statements on important subjects that at the present time concern no one but the historian. For example, the classification of salts as normal, acid, or basic, according to the proportion between "the bonds of the acid radical" and "the bonds of the basic radical," was never generally accepted, and is now universally allowed to be an altogether faulty method. The extraordinary prominence given to hydrogen dioxide or "free hydroxyl," which has four pages devoted to it, while sulphuric acid has little more than two, is scarcely justifiable, we think, at the present time. But on the whole, the book is a useful compendium of the principal properties of not only the more important substances but also of many of the compounds of the rarer elements.

OUR BOOK SHELF.

A Treatise on Geometrical Conics. By A. Cockshott and Rev. F. B. Walters. (London: Macmillan and Co., 1889.)

THIS work is not intended to supersede such works as Besant and Taylor, which, being drawn up for University students, naturally cover a good extent of ground, but to meet what is a pressing need in school teaching. The need of some recognized sequence of propositions, as our authors state, has long been admitted. It was with a view to meet this need, as we have previously stated in this journal, that the Association for the Improvement of Geometrical Teaching published its syllabus of the subject, which had been accepted by the Association at its annual meeting in January 1884. The work before us has been drawn up in accordance with the syllabus, the authors' aim being to invest the skeleton of the syllabus with suitable raiment. A main feature of the outline was the prominence given to Adams's property (which boys will call Adam's property), the S U K I (now changed rightly, as O is used for the external point, to the S U O I) proposition. In the parabola, we are told we may employ the property in proving tangential propositions; in the case of the ellipse and hyperbola, the authors use Adams's, and also give two other constructions. But this is a matter of detail. The proofs are neat and well suited to beginners. A capital feature is the appending quite elementary riders to the respective propositions, these not being too difficult; and in most cases, being true riders on the propositions they follow, they will encourage the young student to prosecute a study which becomes very fascinating when once the student gets a grasp of it. A short chapter on orthogonal projection follows that on the parabola, and is likely to be of use as showing the intimate connection which exists between the circle and the ellipse. A large collection of Cambridge problems, duly labelled, closes the work.

We have waited long for this quasi-authorized edition of the Association's syllabus, "thereby hangs a tale," and now it has reached us we are not disappointed. There are very numerous figures, many of which are excellent, but others are like Pharaoh's lean kine, "very ill-favoured."

Phormium tenax as a Fibrous Plant. Edited by Sir James Hector, K.C.M.G., M.D., F.R.S., &c. With Plates. Second Edition. (Wellington, New Zealand: By authority, George Didsbury, Government Printer, 1889.)

THE original edition of this little hand-book appeared in 1872, since which period a great deal of consideration has been given in this country to the further development of vegetable fibres generally, amongst which New Zealand flax or hemp has had its share. The book has such a varied amount of authentic information on the subject with which it treats that the appearance of a new edition is a distinct gain to those—and they are many—who are occupied at present in the investigation of vegetable fibres.

The description of the *Phormium tenax*, its habit and rate of growth, cultivation, transplanting, and propagation, with an account of the native and European methods of preparing the fibre, are all brought together here in a compact form. The reports, prepared in New Zealand by Messrs. Skey, Nottidge, and Hutton, together with those of Profs. W. R. MacNab and A. H. Church, prepared in this country, are also very valuable. These latter appear in full in the new edition, and the former are in some particulars more detailed. The book is, however, almost a reprint of that which appeared in 1872, in some cases even to the reproduction of errors; thus on p. 2 of both the old and new editions the Raupo, *Typha angustifolia*, is printed *Typhus*.

The most interesting part, at the present time, of Sir James Hector's new issue is, in consequence of its being the newest matter, the preface, from which we learn that during the last two years the demand for *Phormium* fibre has been steadily on the increase, and that one important application is for the production of twine for use in the harvesting machine, it having been found that as a substitute for wire in reapers and binders no fibre is equal to it.

Revision of the British Actiniæ. By Prof. A. C. Haddon. Part I. (London: Williams and Norgate, 1889.)

THIS revision of the British sea anemones by Prof. Haddon, will be welcomed by all students of this interesting group. We know a good deal already of our native species, thanks to the writings of Sir J. Dalzell, Dr. George Johnston, and P. H. Gosse; and the last-mentioned author, in his well-known "History of the British Sea Anemones and Corals" (1858), succeeded, by the aid of chromo-lithography, in giving very fair representations in colours of the living forms. But the "Report on the Actiniaria of the *Challenger*," by Richard Hertwig, in which he sought by anatomical investigations to establish a scientific classification of the group, opened up a new standpoint for the study of these forms, of which Prof. Haddon has most wisely and energetically availed himself; and in this first part of his revision we have a most excellent monograph of the *Chondractininæ*, and studies of several genera, which may be regarded as more or less representing the various stages in the evolution of the typical hexamerous Actiniæ. These latter belong to the families *Edwardsidæ* and *Halcampidæ*. There is also a description of the remarkable *Gonactinia prolifera*, Sars, some notes on *Zoantheæ* and on the development of Actiniæ.

Chitonactis marioni, *Paraphellia expansa*, *Edwardsia tecta*, and *Halcampa arenarea*, are described and figured as new species.

Seven plates accompany this memoir, of which the first two, representing *Chitonactis marioni*, n. sp., *Gephyra dohrnii* (von Koch), *Actinange richardi* (Marion), *Paraphellia expansa* (g. et sp. nn.), *Halcampa arenarea* (n. sp.), *Chondractinia digitata* (Müller), and an undescribed species of *Sagartia*, are very beautifully printed in colours, being perhaps the most life-like illustrations of Actiniaria as yet published in the Transactions of any of our learned Societies.

This memoir forms Part V. of the fourth volume of the Royal Dublin Society's Transactions.

Practical Iron-Founding. By the Author of "Pattern-Making," &c. (London: Whittaker and Co., 1889.)

THIS little volume is an attempt to give, in a condensed form, an account of the principles and practice of iron-

© 1889 Nature Publishing Group